

SUBJECT: EPA Review of Los Angeles Corps District Memorandum for the Record (March 24, 2021), Approved Jurisdictional Determination, East Review Area, Rosemont Copper Mine Project, Pima Co., Arizona

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Background

The Los Angeles District of the U.S. Army Corps of Engineers (SPL) received two Approved Jurisdictional Determination (AJD) requests from HudBay Minerals, Inc. (Requestor) in September 2019 seeking a determination of geographic jurisdiction for lands associated with the Rosemont Copper Mine Project, located in unincorporated Pima County, Arizona. One AJD request covers the 8,676-acre project site on the east side of the Santa Rita Mountains (referred to as the "East Review Area"). EPA has previously provided to the Corps much of the information contained in this analysis. EPA is providing this evaluation of SPLs Memorandum for the Record (MFR) for the East Review Area, consolidating previously submitted information. EPA considered many of the documents referenced by the Corps in the MFR in its analysis.

The EPA is also in receipt of a letter from C. H. Huckelberry, Pima County Administrator, to Colonel Julie A. Balten, Commander, U.S. Army Corps of Engineers, Los Angeles District, dated May 7, 2021. The letter and supporting analyses by Pima County are consistent with and corroborate several findings and conclusions reached by EPA in its review of the AJD. We incorporate Pima County's letter and comments herein by reference.

Application of the Navigable Waters Protection Rule

The Corps' review of jurisdiction was conducted under the Navigable Waters Protection Rule (NWPR). The NWPR includes four categories of jurisdictional waters.

1. (a)(1) Territorial seas and traditional navigable waters (TNW)
2. (a)(2) Tributaries
3. (a)(3) Lakes and ponds, and impoundments of jurisdictional waters
4. (a)(4) Adjacent wetlands

The Corps focused primarily on the status and relationship of Aquatic Resources (ARs) within the East Review Area to (a)(1) TNW waters. Below we provide relevant background information and definitions of the NWPR pertinent to assessing the jurisdictional status of ARs within the East Review Area.

TNWs. The nearest TNW to the East Review Area is the Santa Cruz River, approximately 58 river miles downstream.

Tributaries. Under the NWPR, tributaries must contribute surface water flow to an (a)(1) water in a typical year, either directly or through one or more (a)(2)-(4) waters. A tributary must be perennial or intermittent in a typical year. Ephemeral streams are not jurisdictional waters. A tributary does not lose its jurisdictional status if it contributes surface water flow to a downstream jurisdictional water in a typical year through a channelized non-jurisdictional surface water feature (e.g., an ephemeral stream). The term *perennial* means surface water is flowing continuously year-round. The term *intermittent* means surface water is flowing continuously during certain times of the year and more than in direct response to precipitation (e.g., seasonally when the groundwater table is elevated or snowpack melts). The term *ephemeral* means surface water flowing or pooling only in direct response to precipitation (e.g., rain or snowfall).

Typical year means: when precipitation and other climatic variables are within the normal periodic range (e.g., seasonally, annually) for the geographic area of the applicable aquatic resource based on a rolling thirty-year period. Typical year is a key concept for establishing jurisdiction based on surface water flow between a relatively permanent body of water (*i.e.*, a perennial or intermittent surface water channel, a standing body of open water) and TNWs, and between wetlands and other jurisdictional waters. Application of the typical year concept ensures that the hydrologic flows and surface water connections necessary to establish jurisdiction are characterized based on normal climatic conditions (*i.e.*, neither too wet nor too dry).

An important concept is that the NWPR does not specify minimum flow volumes or flow duration metrics to establish jurisdictional connections to a TNW (NWPR, Final Rule, April 21, 2020, Page 22291). The intermittent flow period can vary widely across the country based upon climate, hydrology, topography, soils, and other conditions. For example, suppose an intermittent (or perennial) aquatic resource (AR) (*i.e.*, stream) connects to an (a)(1) TNW directly or indirectly through an (a)(2) tributary water, regardless of the volume or duration of the connection, in a typical year? In that case, the AR is a jurisdictional tributary. To meet the tributary definition, an intermittent or perennial AR does not have to connect every calendar year to an (a)(1) or (a)(2) water, just once in a typical year.

Therefore, typical year analysis should encompass dates when ARs (*i.e.*, streams) are most likely to be connected to an (a)(1) TNW. For example, a review of discharge records from stream gages downstream from a review area can help identify periods when ARs are most likely to be connected to downstream (a)(1) TNW and (a)(2) tributaries. One can then use the APT whether flows are likely to reach an (a)(1) TNW in a typical year.

Adjacent Wetlands. As defined in the NWPR, (a)(4) wetlands are *adjacent* and thus jurisdictional waters when they meet one of the following criteria: 1) abut, meaning to touch at least at one point or side of, an (a)(1) through (a)(3) water; 2) are inundated by flooding from an (a)(1) through (a)(3) water in a typical year; 3) are physically separated from an (a)(1) through (a)(3) water only by a natural berm, bank, dune, or similar natural feature; or 4) are physically

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separated from an (a)(1) through (a)(3) water only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrologic surface connection between the wetlands and the jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature.

Summary of Corps' Findings

1. The Corps issued a final AJD on March 24, 2021, finding no waters of the United States within the East Review Area. The Corps found that most ARs in the East Review Area are ephemeral streams and therefore are not waters of the United States. The Corps also concluded that three ARs (*i.e.*, Rosemont Spring, MC-2, and East Dam Complex) exhibit intermittent/perennial flows in the East Review Area but lack a connection to a downstream TNW during a typical year and, therefore, are non-jurisdictional. The Corps did not analyze one additional AR, McCleary Dam, where the requester's contractor documented intermittent/perennial streamflow conditions.

2. The Corps did not consider whether intermittent or perennial ARs (*i.e.*, streams) within the East Review Area connected through one or more (a)(2) waters to an (a)(1) TNW. SPL considered only whether intermittent/perennial ARs (*i.e.*, streams) within the East Review Area connected directly to an (a)(1) TNW (*i.e.*, Santa Cruz River) through ephemeral streams in a typical year.

3. The Corps concluded that wetlands adjacent to Rosemont Spring were not jurisdictional because hydric soils were not present.

4. The Corps concluded that several other ARs within the East Review Area are not jurisdictional because they (1) are isolated features and not adjacent to other jurisdictional waters (*i.e.*, Schofield Spring and wetland), or (2) do not support intermittent/perennial flow (*i.e.*, Wasp Canyon).

Summary of EPA Findings

1. The EPA believes that the Corps' jurisdictional analysis is flawed in several crucial areas leading to erroneous conclusions regarding jurisdictional waters within the East Review Area.

2. EPA's analysis finds that jurisdictional waters of the United States are present within the East Review Area. At least five intermittent/perennial ARs (*i.e.*, streams) meet the (a)(2) tributary definition of the NWPR (*i.e.*, Rosemont Spring, MC-2, East Dam Complex, McCleary Dam, and Wasp Canyon). EPA finds that these intermittent/perennial tributaries contribute channelized surface flow directly and through one or more (a)(2) waters to the Santa Cruz River, an (a)(1) TNW, during a typical year.

3. The Corps did not conduct a proper typical year analysis using the Antecedent Precipitation Tool (APT) for the three intermittent/perennial stream reaches (*i.e.*, Rosemont Spring, MC-2, and East Dam Complex). The Corps failed to assess whether these ARs connect through one or more (a)(2) waters to a TNW during a typical year.

4. The EPA finds that at least five intermittent/perennial stream reaches (*i.e.*, Rosemont Spring, MC-2, East Dam Complex, McCleary Dam, and Wasp Canyon) likely connect through at least four (a)(2) waters to the Santa Cruz River, an (a)(1) TNW, during a typical year. We confirmed surface flow connections by analyzing peak flow discharge data from seven USGS and Pima County stream gages and applying the APT (Attachment 1). Streamflow modeling by the requestor's consultant corroborates the results from EPA's stream gage/APT analysis that flows from the five ARs in the East Review Area would flow to the four (a)(2) waters under a variety of modeled flow conditions (Tetra Tech 2016)(Table 1). For example, the modeled 1-year, 24-hour, and the 5-year, 24-hour flows would extend downstream from the East Review Area 14.6 and 18.3 miles, respectively (Table 1).

5. The EPA concludes that wetlands adjacent to Rosemont Spring are jurisdictional as adjacent wetlands because they meet the wetland criteria for hydrophytic vegetation, hydric soils, and wetland hydrology. As noted above, EPA believes Rosemont Spring is a jurisdictional tributary.

Specific EPA Comments

Section 3. Assessment of Geographic Jurisdiction, Page 4. The Corps assessed two primary factors in making its jurisdictional determination. The Corps first assessed the flow regimes of the ARs present in the review area. The Corps notes that under the NWPR, ephemeral features are considered non-jurisdictional [33 CFR 328.3(c)(8)]. In contrast, intermittent/perennial features may be jurisdictional if they contribute flow during a "typical year" to a TNW or territorial sea.

EPA Comments: The Corps correctly notes that intermittent/perennial ARs that contribute flow during a "typical year" directly to a TNW or indirectly through an (a)(2) tributary, are jurisdictional. However, the Corps considered only the first scenario. They provided no analysis of typical year flows from the East Review Area ARs to downstream (a)(2) tributaries before reaching an (a)(1) water.¹ Assessment of whether the East Review Area ARs flow to (a)(2) waters is an essential step that the Corps did not conduct.

EPA has identified at least four intermittent/perennial ARs downstream from the East Review Area that likely are (a)(2) tributary reaches (Table 2). Supporting evidence that these ARs

¹ On page 11, the Corps states: *The final question to be answered regarding jurisdiction under the NWPR is whether flow from these ARs during a typical year would reach an a(1) water (territorial sea or TNW), an a(2) water (tributary to an [1] water), or an a(3) water (lake, pond, impoundment of jurisdictional waters). The closest applicable water downstream from the review area is the Santa Cruz River (Reach B) TNW, which is 56.1 river miles downstream from the review area.*

qualify as (a)(2) tributaries comes from aerial photography, site inspections, and supporting information from Pima County and other sources. To qualify as a water of the United States under the NWPR, an intermittent/perennial AR (*i.e.*, stream) must flow to an (a)(1) TNW directly or indirectly through (a)(2), (a)(3) or an (a)(4) waters, or certain non-jurisdictional channelized flow, regardless of the volume or duration of the connection, in a typical year. To understand whether the five intermittent/perennial ARs within the East Review Area flow to (a)(1) or (a)(2) waters, EPA reviewed peak streamflow data from seven USGS and Pima County gages downstream from the East Review Area. The flow data shows that surface waters at the Rosemont Mine site within the East Review Area connected on the exact dates at all streamflow gaging stations to the Santa Cruz River during typical year conditions in 2010, 2011, 2015, and 2018. EPA did not assess all years, so there may be more instances when such connections occurred. One only needs to show a connection once under typical year conditions once (*i.e.*, there is no frequency or duration flow requirement under the NWPR).

Section 3.a.ii. East Area, Page 8, paragraph 3. The Corps states that except for the East Dam complex, stock tanks within the East Review Area are all located on ephemeral, non-jurisdictional drainages. In a 2015 memorandum submitted by Hudbay to Coronado National Forest, surface flow was documented at McCleary Dam on at least forty-four occasions on multiple dates over ten years from 09/04/2008 to 01/07/2015 (Hudbay 2015). Also, in a report prepared for the Corps by the requester's consultant, an AR at McCleary Dam was characterized by seasonal surface flows below the dam for 50-300 feet (Westland Resources, Inc. 2019). EPA applied the APT tool to dates where surface water is visible in Google Earth aerial photographs below McCleary Dam (Table 3). Application of the APT on these dates shows that the McCleary Dam AR supports intermittent streamflow under normal and drier-than-normal antecedent precipitation conditions during the dry season under conditions of mild, moderate, and severe drought. EPA believes that this information shows that McCleary Dam is a non-ephemeral, intermittent AR that should be assessed to determine if it qualifies as an (a)(2) tributary (refer to additional EPA analysis that follows).

Section 3.a.ii. East Area, Page 8, paragraph 4. As part of the September 2019 AJD request, the requestor provided documentation on 19 potential wetland sites, consisting of seeps and springs, in the East Review Area. The Corps concludes that only Schofield Spring meets all three wetland parameters. The requestor concluded that Rosemont Spring did not qualify as a wetland because it lacked hydric soils. However, positive hydrophytic vegetation and wetland hydrology indicators were documented (WestLand Resources, Inc. 2019, Wetland Determination Data Form DP-5, dated 9/20/2007).

EPA Comments: The EPA believes that Rosemont Spring also supports jurisdictional wetlands adjacent to an intermittent/perennial (a)(2) tributary. A common misinterpretation made when delineating wetlands in the arid west is an assumption that shallow, sandy alluvium overlying bedrock cannot meet the hydric soil criterion due to the lack of classic hydric indicators within the soil profile. One would not expect typical hydric soil indicators where a thin, oft disturbed, sandy soil layer overlies bedrock. In this case, the wetlands soil criterion is met by long- to very-

long duration flooding or saturation in the root zone of the dominant hydrophytes. The soils at Rosemont Spring should have been identified as “problematic” sandy alluvium. The hydric soil criterion is satisfied because the alluvium is flooded or saturated for long or very long duration in the presence of hydrophytic vegetation and wetland hydrology.

Previously in email communications, EPA provided the Corps with photographic evidence and documented observations made during three field trips to Rosemont Spring. The stream always exhibited surface flow during these visits. EPA observed positive indicators of hydrophytic vegetation, wetland hydrology, and hydric soils during all three site visits. During a site visit to Rosemont Spring on April 21, 2016, the tributary exhibited surface flow for 327 linear feet. There was a band of adjacent, jurisdictional wetland adjacent to the stream channel characterized by deergrass (*Muhlenbergia rigens*, FAC), and a few scattered *Mimulus* sp. (FACW), and an indigo bush (*Amorpha frutosa*, FACW). Also, live algae were observed in the flowing tributary.

Section 3.a.ii. East Area, Page 9, paragraph 2. The Corps concludes based on the requester's report (see Westland Resources, Inc. 2019) that the Wasp Canyon AR, *was found to have a very minor, poorly defined connection to groundwater based on field observations and [that] the feature does not support a non-ephemeral AR*. EPA believes that there is insufficient information to support a conclusion that Wasp Canyon is an ephemeral AR. Some of the Corps supporting information supports a finding that Wasp Canyon AR is likely intermittent. The single observation on 06/14/2006 of Wasp Canyon (AR) by Westland Resources Inc. (2019) occurred during Normal antecedent precipitation conditions. However, this was during the dry season and under conditions of extreme drought. Wetland Resources Inc. (2020) reports that of 20 site visits to the Wasp Canyon AR between June 2005 and July 2019, there was no surface water present during five site visits.

In contrast, during at least 14 of 20 visits (surface water not measured during one visit), or 70% of the time, surface water was observed. The average distance of flow over this period was 1.5 meters, which means that some surface flows likely traveled over much longer distances. Most recently, on 12/02/2020, the requester's contractor observed no surface flow at the site. It is notable that during this wet season date, the APT recorded drier-than normal (-9) antecedent precipitation conditions during a drought.

EPA Comment: From this information, EPA concludes that the Wasp Canyon AR supports intermittent surface flows and that the data do not support the Corps' conclusion that the AR is ephemeral.

Section 3.a.ii. Conclusion, Page 10, paragraph 2. The Corps concludes, in part, that a typical year analysis is only required for stream reaches immediately downstream from Rosemont Spring, MC-2, and the East Dam complex.

EPA Comment: EPA analysis supports a conclusion that in addition to these three intermittent streams, a typical year analysis is also required for the McCleary Dam and Wasp Canyon intermittent reaches.

Section 3.b. Typical Year Flows, Page 11, paragraph 1. The Corps applied the APT to assess precipitation conditions at the three locations (*i.e.*, Rosemont Spring, MC-2, and East Dam complex). The Corps selected a central representative point between the three ARs for the assessment. The Corps ran the APT for a single date, December 2, 2020. The Corps chose this date because two of the three locations were observed to have surface water present on that exact date. The APT results indicated that the most recent rain event in the area was about three weeks before the field visit. The Palmer Drought Severity Index for December 2, 2020 was *extreme drought*, and precipitation conditions before the observation date were considered drier-than-normal. The information from the APT indicates that conditions were drier than in a typical year.

EPA Comments: The Corps misapplied the APT in determining typical year conditions within the East Review Area. The Corps applied the APT to assess flow conditions for a single point in time (12/02/2020) during drier-than-normal conditions in an extreme drought. Therefore, any conclusions regarding streamflow conditions and connections to an (a)(1) TNW or (a)(2) tributaries only apply to December 2, 2020. The NWPR states: *...the agencies would not expect to observe streamflow in seasonally dry conditions, even if precipitation during those dry conditions is considered typical for the dates of interest. The agencies may need to use the multiple tools described above to determine the flow classification for a tributary that is not flowing because of seasonally dry conditions...* (NWPR, Final Rule, April 20, 2020, Page 22295). The Corps did not follow this guidance when the agency assessed streamflow conditions on a single date during drier-than-normal conditions in an extreme drought.

Proper application of the APT tool for determining typical year conditions requires that the ARs be assessed on one or more dates during periods when stream flows are most likely to connect to an (a)(1) TNW or (a)(2) tributaries. A review of historical peak discharge records at seven USGS and Pima County gages at various locations downstream from the East Review Area can reveal where there are surface connections to jurisdictional waters (Attachment 1). The Corps failed to assess available stream gage data in its typical year analysis. The NWPR acknowledges that local stream gage data can provide important information when evaluating flow conditions (NWPR, Final Rule, April 21, 2020, Page 22293).

In this case, the threshold question for assessing jurisdiction is: Do the intermittent/perennial stream ARs with the East Review Area connect when flows show a continuous surface water connection to (a)(1) TNW or (a)(2) tributary waters during a typical year, as determined by the APT? Connecting flows to downstream (a)(1) TNW or (a)(2) tributary waters can be through intervening ephemeral streams if the connection is during a typical year. Proper application of APT to peak stream discharge records confirms that surface flows from East Review Area ARs can reach the (a)(1) TNW and (a)(2) tributaries during a typical year.

EPA reviewed peak stream discharge data from seven USGS and Pima County stream gages (i.e., September 19-20, 2018, September 3-4, 2015, September 9-10, 2011, July 29-30, 2010). During these periods, surface flows from the East Review Area connected directly to the Santa Cruz River TNWEPA and indirectly through four (a)(2) tributaries (Attachment 1).² The December 19-20, 2018 peak discharge data provides an example of the continuity of flow through various gages from the East Review Area to the Santa Cruz River (Figure 1). The USGS Barrel Canyon gage (9484580) at the downstream boundary of the East Review Area lies from 2.3 to 5.1 miles downstream from the five intermittent ARs within the East Review Area (Table 2). Peak flows at the Barrel Canyon gage for the four periods are as follows: 2010 (mean peak = 50 cfs); 2011 (1,780 cfs); 2015 (528 cfs); 2018 (mean peak = 1.18 cfs). The nearest (a)(2) tributary reach to the East Review Area is the near Barrel Spring that lies 3.1 to 5.7 miles downstream from the five East Review Area ARs (Table 2).

The Barrel Canyon gage reflects streamflow contributions from all upstream tributaries within the East Review Area. Barrel Canyon and its tributaries are losing streams (i.e., streams that lose water through infiltration as they flow downstream). Thus, the total flow measured at Barrel Canyon gage will generally be less than the total combined flow amounts of tributaries at any point upstream of the gage. Flows recorded at the Barrel Canyon are a proxy (i.e., data used to represent the value/presence of upstream flows in a calculation) for all contributing tributaries upstream of the gage. For example, peak flows recorded at the Barrel Canyon gage for 2011 and 2015 were 528 cfs and 1,780 cfs, respectively (Attachment 1). These peak flows represent the combined total contributions for all streams upstream of the gage. These measured flows provide compelling evidence of surface connections between all streams with the East Review Area and the Barrel Canyon gage and downstream surface waters recorded at other gages.

Section 3.b. Typical Year Flows, Pages 11-12, paragraph 1. The Corps states that the final question to be answered regarding jurisdiction under the NWPR is whether flow for the East Review Area ARs during a typical year would reach an (a)(1) TNW, an (a)(2) tributary, or an (a)(3) lake, pond, or impoundment of jurisdictional waters. The Corps correctly identifies the Santa Cruz River as the closest TNW about 56 miles downstream from the East Review Area. The Corps concludes that based on review of previous PJDs and information developed by the requester for three of the ARs in the East Review Area (see Westland Resources, Inc. 2020) that it is very unlikely that flows from the three assessed ARs reach the Santa Cruz TNW in a typical year.

The Corps concludes that field observations by the requester's consultant (see Westland Resources, Inc. 2020) during the monsoon period (June through September) indicate that surface flows persist at an average distance of 17 to 116 meters downstream from the ARs water source. From these limited observations, the Corps further concludes that *the downstream flows are only locally relevant within a very small portion of the watershed and would have no meaningful connection to the distant TNW because of the small amount of flow and large distance between*

² EPA did not assess peak flows for the entire period of record.

the feature and the TNW. These intermittent features connect with an ephemeral wash network with a high infiltration rate from the substrate in these washes, resulting in a rapid loss of flow, and provide a minimal contribution to downstream flows. (pp. 11-12).

EPA Comments: The Corps acknowledges that to be jurisdictional ARs in the East Review Area during a typical year would need to reach an (a)(1) TNW, an (a)(2) tributary, or an (a)(3) lake, pond, or impoundment of jurisdictional waters. However, the Corps provides no analysis of whether the three assessed ARs reach an (a)(1) TNW or (a)(2) tributary in a typical year. As discussed above, EPA's analysis shows that five ARs in the East Review Area flow during a typical year directly to the Santa Cruz River, an (a)(1) TNW, and indirectly through at least four (a)(2) tributaries (Attachment 1).

The Corps' conclusion that the ARs observed average flow distances of 17 to 116 meters demonstrate the lack of a connection to a TNW in a typical year is unfounded. In this regard, the only conclusion supported from these observations is that the ARs do not exhibit a surface water connection to the TNW on the exact observation dates. The Corps should have analyzed peak streamflow data at stream gages downstream from the East Review Area to determine the likelihood of connections of ARs to downstream jurisdictional waters. As discussed above, EPA found evidence for several years from streamflow gage records that five ARs in the East Review Area can reach the (a)(1) TNW and (a)(2) tributaries during a typical year.

Additional physical evidence that the five ARs regularly connect via surface flows to downstream jurisdictional waters is visible in multiple Google Earth aerial photographs. For most years, there is evidence of an Ordinary High Water Mark, channel/bank erosion, and sediment deposition along drainages throughout the East Review Area, including stream reaches downstream from the five intermittent/perennial ARs. This evidence is perhaps best seen in drainages with graded, earthen road crossings that require regular regrading after flows have washed out the existing road crossings. Changes in channel dimensions and configurations are visible between years. Aerial photographs indicate that East Review Area drainages flow along their entire lengths in most years for linear distances greater than documented by the requester's consultant. The NWPR supports the use of such physical evidence noting that *...evidence of recent flow can be observed through the presence of multiple or abundant signs of certain ordinary high water mark indicators for the region such as the presence of point bars, concentrations of drift deposits, or the destruction of terrestrial vegetation. (p. 22295).* These listed indicators are present within streams flowing from ARs in the East Review Area. The Corps has presented no evidence that would support a finding that surface flows from the ARs in the East Review Area would not reach an (a)(1) TNW or (a)(2) tributaries during runoff events recorded on stream gages.

Section 4.a. Assessment of Third-Party Input, Page 12, Paragraph 4. The Corps states: *Formal coordination of the AJD decisions with EPA is not required because neither AJD is a negative determination that severs upstream ARs nor affirmative AJDs. However, SPL coordinated with EPA on an informal basis after EPA staff expressed interest in these AJDs.*

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EPA Comments: Part 6(a) of the Memorandum: U.S. Environmental Protection Agency (EPA) and the Department of the Army (Army), Corps of Engineers (Corps) Coordination to Ensure Consistent Implementation of the Navigable Waters Protection Rule, dated 8/5/2020 states: *Draft approved JDs where a negative jurisdictional decision based solely on a finding that a non-jurisdictional feature (e.g., ephemeral stream) or artificial structure (e.g., dam, spillway) does not convey surface water flow to a downstream jurisdictional water in a typical year and thus severs jurisdiction of the subject water and potentially implicates upstream aquatic resources. Coordination under this paragraph is not intended to include a decision that an individual wetland, lake, pond, or impoundment of a jurisdictional water lacks a sufficient connection to a downstream jurisdictional water to be jurisdictional.* (p.4).

The Corps' analysis of flow regime for the AJD is specifically covered by Part 6(b) of the Coordination Memorandum and formal consultation by the Corps with EPA is required. The Corps' negative jurisdictional decision is based solely on a finding that ephemeral streams do not convey flow to a downstream jurisdictional water in a typical year; thereby severing jurisdiction of the subject ARs and potentially implicating upstream aquatic resources. Notably, there are potential ARs (e.g., streams) upstream from the East Review Area that the Corps did not assess. For example, portions of streams A4 and A5 (as depicted in requester's consultant GIS database) extend upstream and outside the East Review Area and were not assessed for the presence of ARs. It also appears that tributaries to drainage A2 that exhibit bed and bank features, and an OHWM, were not mapped, and this drainage may also extend beyond the boundary of the East Review Area.

The Corps did informally share some information with the EPA used in the AJD analysis and periodically update the EPA on its review status. However, the Corps did not formally or informally coordinate with EPA before issuing a final AJD decision, even though the Corps management and staff agreed to do so on several occasions.

Assessment of Third-Party Input. Section 4.a.viii, Page 15. The EPA provided the Corps with streamflow gage discharge data and analysis that shows that five intermittent/perennial ARs within the East Review Area connect directly and indirectly through ephemeral streams and (a)(2) tributaries to the (a)(1) Santa Cruz TNW during a typical year. The Corps concludes: *Based on the analysis of flow regimes in the review areas, a typical year analysis is only needed for the three non-ephemeral features in the East area review area. This is addressed in paragraph 3 of this MFR.*

EPA Comments: As previously noted, the Corps did not conduct a robust analysis of flow regimes in the review area. It assessed flow conditions on a single date (i.e., 12/20/2020) during drier-than-normal antecedent precipitation conditions in a drought when there were no measurable flows at the Barrel Gage. The Corps also used several observations of streamflow distance below the ARs to assess typical year conditions. Still, they misapplied this information, thus reaching erroneous conclusions about typical year flow conditions. The Corps did not

consider typical year flow conditions within the East Assessment Area when there was measurable flow at the Barrel Canyon gage.

Additional Considerations

- Spring SC-2 (31.870884, -110.724975) contributes flow to an AR stream. The length of surface flow is visible in the following Google Earth aerial photographs (05/04/2019: 132 feet), (08/18/2018: 32 feet), 02/23/2017: 26 feet). Westland Resources, Inc. (2109) visited this spring and tributary to Schofield Canyon on 06/15/2006, during the dry season and extreme drought, when no water was present, and concluded that this site normally is dry. The APT shows Normal conditions (-12). The APT shows Normal conditions (-12) on 05/04/2019, during the dry season, with mild wetness. For 08/18/2018, the APT shows Normal conditions (-13) during the dry season and extreme drought. The 2018-2019 data indicate that the site is not *normally dry* during normal antecedent precipitation conditions, as Westland Resources, Inc. (2019) concluded.
- As discussed above, streamflow modeling by the requestor's consultant (see Tetra Tech 2016, Attachment 2) corroborates the results from EPA's stream gage/APT analysis that flows from the five ARs in the East Review Area would flow to the four (a)(2) waters under a variety of flow conditions (Table 4). The Tetra Tech model has limited applicability for determining the conditions under which stream flows from the East Review Area would reach the Santa Cruz River, a TNW. The model did not consider the flow contributions of additional flow from tributaries below the Barrel Canyon gage that would increase the runoff flow distance. As also discussed above, EPA's analysis of discharges from several stream gages downstream of the Barrel Canyon gage shows continuous flows for four typical years from the East Review Area to the (a)(1) waters of the Santa Cruz River.

References

HudBay Minerals. 2015. Memorandum: Water Quality/Water Level Data for U.S. Forest Service. Memo from Karen Herther transmitted by Kathy Arnold, HudBay Minerals to James Upchurch, Forest Supervisor, Coronado National Forest, January 17, 2015, 21 pages.

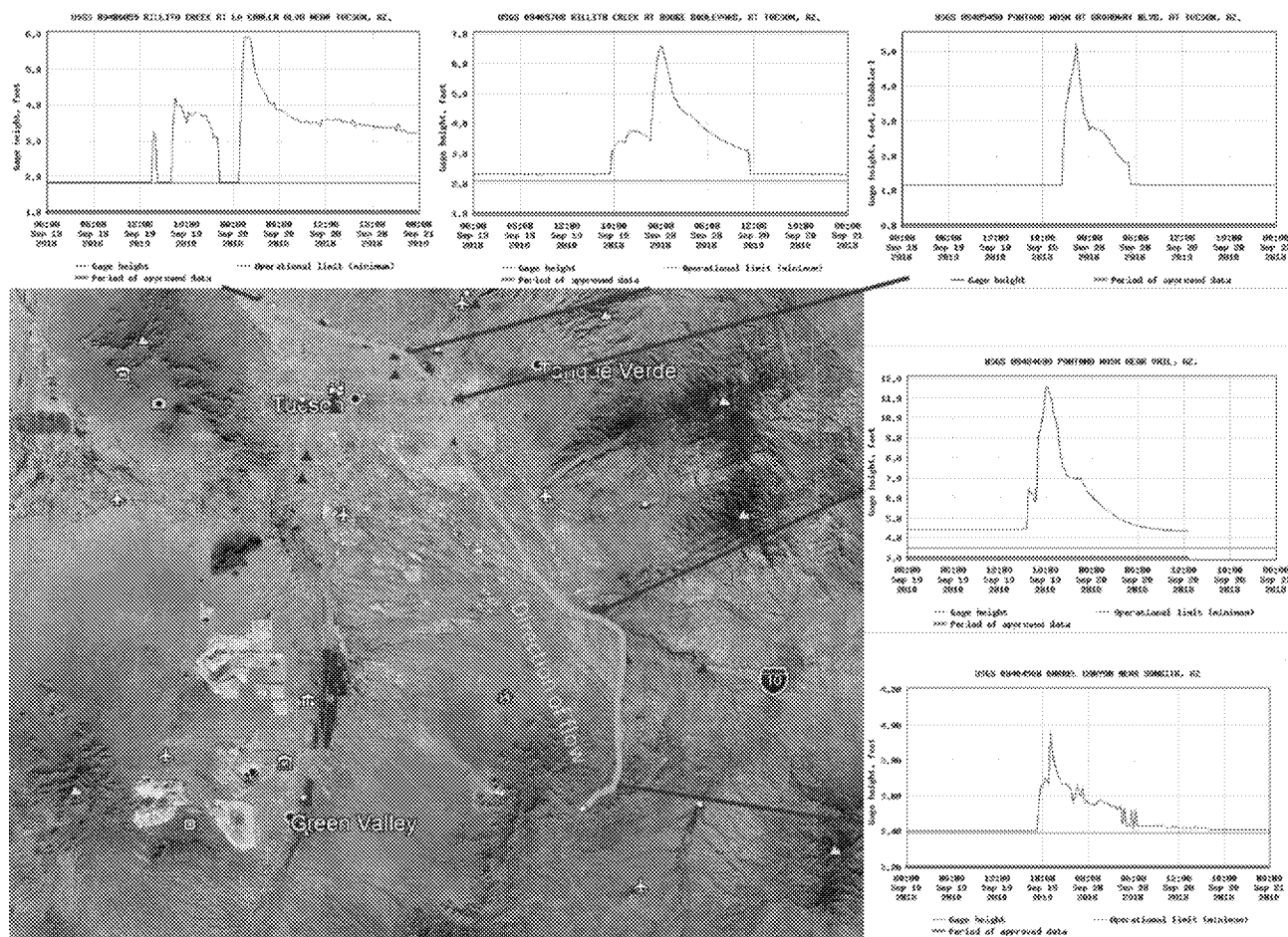
Tetra Tech. 2016. Preliminary Rosemont Traditional Navigable Waters Runoff Calculations. Prepared for Rosemont Copper (Hudbay Minerals). (Document No. 133-24549-17004-1). December 1, 2016.

WestLand Resources, Inc. 2020. Rosemont Approved Jurisdictional Determinations: Response to ACOE Request for Information. Prepared for Rosemont Copper Company (Project No. 1049.128). December 7, 2020.

WestLand Resources, Inc. 2019. Jurisdictional Waters Determination for the Rosemont Copper Project Site, Pima County, Arizona. Prepared for U.S. Army Corps of Engineers. Prepared on behalf of Rosemont Copper Company (Project No. 1029.148). September 20, 2019.

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Figure 1. Aerial photograph showing the location of stream gages between potential (a)(2) waters on the Rosemont Mine Site East Review Area and nearest TNW (Santa Cruz River), and stream stage data during the September 19-20, 2018 flow event. Peak flows originating from (a)(2) waters within the East Review Area and from other contributing streams appear around 18:00 on 09/19/2018 at the USGS Barrel Canyon Gage (09484850) and reaches Rillito Creek at La Cholla Blvd gage (09486055) around 01:00 on 09/20/2018.



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Table 1. Streamflow modeling by the requestor's consultant for the Rosemont Mine Site (Tetra Tech 2016). Runoff flow travel distance is modeled from the Barrel Canyon Gage (USGS 9484580). Refer to Tetra Tech (2016) for methods.

Table 1. Analysis Results

Storm Event	Rainfall Depth (in)	*Areal Reduced Rainfall Depth (in)	Modeled Runoff Volume (af)	Modeled Peak Flow (cfs)	TL Model (af/mi)	Runoff Flow Travel Distance (mi)
1-yr, 24-hr	1.77	1.58	270	1146	18.5	14.6
2-yr, 24-hr	2.21	1.97	434	1934	26.4	16.4
5-yr, 24-hr	2.75	2.45	665	3061	36.4	18.3
10-yr, 24-hr	3.18	2.83	864	4044	44.3	19.5
25-yr, 24-hr	3.77	3.36	1160	5510	55.3	21.0
50-yr, 24-hr	4.23	3.76	1395	6669	63.5	22.0
100-yr, 24-hr	4.75	4.23	1681	8072	73.0	23.0
200-yr, 24-hr	5.28	4.70	1974	9507	82.3	24.0
500-yr, 24-hr	6.00	5.34	2384	11500	94.8	25.1
1000-yr, 24-hr	6.57	5.85	2718	13111	104.6	26.0
Local PMP	15.00	--	8887	57542	254.5	34.9
General PMP	18.90	--	12029	14485	319.3	37.7

*Areal reduction factor of 0.89 used (per Hydro 40)

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Table 2. Five Intermittent/Perennial Aquatic Resources within the East Review Area and Distances to Stream Gages and the TNW.

Intermittent/Perennial Aquatic Resources with East Review Area	Approximate Downstream Distance (river miles) to (a)(2) Tributary Reaches, Stream Gages (number), and TNW ¹										
	(Red shaded column headings denote stream gage locations)										
	USGS (9484580) Barrel Canyon at SR-83	Barrel Canyon Spring - (a)(2) Tributary	Davidson Canyon, Reach 1- (a)(2) Tributary	Pima Co. (4313) Davidson Canyon above I-10	Cienega Creek at Davidson Canyon (a)(2) Tributary	USGS (9484600) Pantano Wash Vail (a)(2) Tributary	Pima Co. (4263) Pantano Wash at Schist	USGS (9485450) Pantano Wash at Broadway	USGS (9485700) Rillito River at Dodge	USGS (9486055) Rillito River at Cholla	Santa Cruz River (TNW)
East Dam	2.3	3.1	14.2	15.1	16.8	19.7	20.7	37.8	44.5	51.5	54.2
McCleary Dam	3.4	4.2	15.3	16.2	17.9	20.8	21.8	38.9	45.6	52.6	55.3
Rosemont Spring	4.5	5.3	16.4	17.3	19.0	21.9	22.9	40.0	46.7	53.7	56.4
MC-2	4.9	5.5	16.6	20.5	22.1	24.0	25.0	42.1	48.8	55.8	58.5
Wasp Canyon	5.1	5.7	16.8	20.7	22.3	24.2	25.2	42.3	49.0	56.0	58.7

¹GPS coordinates for tributary reaches, stream gages, TNW, and intermittent/perennial ARs within East Review Area.
USGS at Barrel Canyon (31.86167, -110.69056), Davidson Canyon, Reach 1 (31.985096, -110.647332), Pima County gage, Davidson Canyon, above I-10 (31.99358, -110.64513), Cienega Creek at confluence of Davidson Canyon (32.018174, -110.642836), USGS gage at Pantano Dam, (32.03583, -110.67694), Pima County gage, Pantano Wash at Shist (32.04327, -110.69001), USGS gage, Pantano Wash at Broadway Blvd (32.22056, -110.82889), USGS gage, Rillito Creek at Dodge Blvd (32.27139, -110.91389), USGS Rillito Creek at Cholla Street (32.30333, -110.01139), Santa Cruz River (32.319992, -110.053388).
East Dam (31.839952, -110.711368), McCleary Dam (31.842660, -110.731290), Rosemont Spring (31.828074, -110.737554), MC-2 (31.848249, -110.748994).

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Table 3. Google Earth aerial photographs that depict visible streamflow at McCleary Dam, East Review Area (31.842598, -110.731288) with corresponding APT analysis.

Date	APT Condition (score)	Palmer Drought Index	Season	Surface Flow Length (ft)
05/04/2019	Normal (-12)	Mild Wetness	Dry	235
09/26/2018	Drier than Normal (-8)	Normal	Dry	132
04/06/2013	Drier than Normal (-7)	Severe Drought	Dry	160
04/15/2009 ¹	Normal (-10)	Moderate Drought	Dry	50
¹ Surface flow documented in Westland Resources Inc. (2019).				